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AUTHOR Nutting, Paul A.; And Others
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ABSTRACT

Utilizing a quality assessment methodology for ambulatory patient care currently under development by the Indian Health Service's (IHS) Office of Research and Development, comparisons were made between results derived from a pilot test in IHS service units, 2 metropolitan Health Maintenance Organizations (HMO), and 3 rural private practices. Comparison of the systems' performances were made for the following tracer conditions: prenatal care; infant care; streptococcal; urinary tract infection; lacerations of scalp and extremities; hypertension; and iron-deficiency anemia. Results indicated: no substantial and consistant difference in the performance of the providers of care; observable differences attributable to patient contact with the system of care or system recognition of the need for service; IHS provided more widespread application of counseling and educational tasks and selected screening tasks, had higher patient contacts, and had lower recognition of the need for service than private practices or HMO's; private practices and HMO's had higher recognition of service need and higher follow-up rates than IHS; private practices had somewhat of a higher follow-up rate than the HMO's; HMO's had a somewhat higher application rate for counseling, education, and health surveillance tasks than private practices. Since the provider indicators did not reveal a particularly high level of performance, it was concluded that systems performance could be substantially improved if all practices capitalized upon existing patient visit patterns. (JC)

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STUDIES IN AMBULATORY CARE

QUALITY ASSESSMENT IN THE

INDIAN HEALTH SERVICE

VOLUME III: Comparison Of Rural Private Practice, Health Maintenance Organizations, And The Indian Health Service

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Paul A. Nutting, M.D.

Edward F. Helmick, MPH

Rosemary E. Falvey

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

Office of Research and Development
Indian Health Service
P.O. Box 11340
Tucson, Arizona 85734

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ABSTRACT

A quality assessment methodology for ambulatory patient care is under development by the Office of Research and Development of the Indian Health Service. This report summarizes the conceptual basis of the methodology and describes a pilot test in six service units of the Indian Health Service, three rural private practices, and two metropolitan health maintenance organizations. The results for seven tracer conditions, designed to examine health system performance in terms of care provided by the system, care received by the beneficiary population, and the continuity are presented. Although the data from the pilot sites, which were selected in a non-random manner, do not necessarily reflect the quality of ambulatory care from each practice type, several trends are noted and briefly discussed.

INTRODUCTION:

The Indian Health Service (IHS) of the Department of Health, Education, and Welfare has the primary responsibility for assuring comprehensive health services to over 600,000 American Indians and Alaskan Natives. This responsibility is discharged through a series of service units located in Indian communities and designed to provide preventive, health maintenance, and curative services to the beneficiary populations.

Although there is a growing national concern with the quality of health care, most of the developmental efforts to date have concentrated on inpatient care. The Indian Health Service is deeply concerned with the quality of hospital care as witnessed by the relatively large number of service unit hospitals which have earned accreditation by the Joint Commission for Accreditation of Hospitals. However, service unit hospitals represent only one component of the IHS health care system and inpatient care is only one of several alternative modes of providing health care to the beneficiary population. For this reason, concern for the quality of health care extends to that care provided in the outpatient clinic and in a variety of field-based activities. Since the IHS health care system employs a variety of disciplinary groups in the provision of health services, it is of particular importance to examine the continuity of care provided by the various components of the health care system.

The Office of Research and Development of the Indian Health Service has been developing a methodology for assessing the effectiveness of ambulatory care [1,2]. This report is part of a series describing a pilot test of the assessment methodology in six service units of the Indian Health Service, three rural private practices, and two health maintenance organizations (HMO's).

The first report presents an overview of the methodology [3] and the second describes the results from the six service units of the IHS [4]. This report presents and compares the results obtained from the IHS service units, rural private practice, and the HMO's.

METHODOLOGY:

The conceptual basis of the assessment methodology has been fully described elsewhere [2,3]. In summary, the assessment strategy is completed in stages. First, a set of health problems (tracers) is selected to represent the major health problems of the community. A process map (or clinical algorithm) is constructed for each health problem to describe the expected process of health care. Process maps specify necessary elements of prevention, screening, diagnosis, treatment, and follow-up, and they define acceptable health outcomes. In general the set of tracers selected should, as a group, include all the clinical functions for examination.

Criteria of clinical care are defined for each tracer condition and are translated into audit questions (called indicators) which are the actual measures of quality. The indicators are generally of three types. Population-based process indicators express a percent of the total community which has received a particular health service. This class of indicators characterizes the extent to which the health care system is meeting the needs of its total patient population. By tracking specific patient cohorts they describe the continuity, distribution, and appropriateness of health services received. This measure of system performance might be reflected by population-based indicators such as:

1. What percent of the community has been adequately screened for hypertension?
2. What percent of infants in the community has been adequately immunized against poliomyelitis?
3. What percent of patients diagnosed with otitis media, received adequate antibiotic therapy?

Provider-based indicators express a percent of contacts between patients and the health care system in which particular health services were provided. This class of indicator characterizes the adequacy of health services provided when patients utilize the health care system. Provider-based indicator data can be aggregated to characterize the performance of individual providers, provider disciplines, or all providers in the system. This performance measure might be reflected by indicators such as:

1. What percent of patient visits due for a screening blood pressure resulted in a blood pressure recording?
2. What percent of infant visits due for poliomyelitis immunization resulted in an immunization?
3. What percent of patient visits including a diagnosis of otitis media, was an appropriate antibiotic prescribed and a follow-up visit scheduled at an appropriate interval?

Finally, health status indicators express the percent of patients for whom a change in health status has been documented. One should be cautioned against equating health status indicators with measures of incidence or prevalence since the latter requires a random sampling of the population. Health status indicators on the other hand often reflect change in health

status of selected patient group; e.g., only those who were followed-up.

Table 1 shows the tracer conditions used in the pilot study along with the assessment perspective (population-based or provider-based) and clinical functions of care covered by each. Figure 1, shows the process map for lacerations and the points in the process of care from which indicator data is extracted.

Some indicators are analagous to "flow meters" and can be constructed in a sequence in order to examine the continuity of care. From the process map for iron-deficiency anemia, shown in figure 2, the population can be seen to percolate down through a variety of pathways. If flow meter indicators are placed along the major routes, they will measure the distribution and continuity of health services. For example, if an indicator is placed at the entrance of the diagnostic element, the results will show how well diagnostic services are distributed among the screened-positive population. These indicator sequences may focus on any of the clinical functions of the health care process and can express "continuity" as a series of conditional probabilities based on empirical data. By examining continuity of care in this way, the assessment methodology can identify discontinuities in health care and distinguish between those related to provider-behavior and those related to patient utilization of services.

In general, a required health task is completed only when three basic steps occur. First, there must be contact between the patient and an appropriate provider. Second, the need for that health care task must be recognized, and finally the task must be performed. Conventional wisdom would suggest that making contact with the health care system for services is generally the responsibility of the patient. The recognition function is the shared responsibility of the patient who may reflect need in his chief complaint, and the

provider who reviews the patient's record. The performance of the task, finally, is the responsibility of the provider. In this study urinary tract infections, iron-deficiency anemia, and hypertension are the tracers designed to examine the continuity of care in this way.

The pilot sites employed in this study and characterized in table 2 were chosen in a non-random manner. Four of the six service units (C,D,E,F) were included due to a shared concern for the quality of ambulatory care, while the other two were included due to characteristics of their system or population that made the total group more representative of IHS service units in general. The three private practices were selected from rural areas. Private practices B and C are from the same general geographic area as service units C and D, while private practice A is located in proximity to services units A and B and both HMO's. In no instance did a pilot site, approached for inclusion in this study, decline. In all cases, the clinical personnel were extremely cooperative and indicated an interest in constructively utilizing the study results to improve the quality of care which they provide.

Criteria of clinical care were established for each tracer by a consultant with recognized expertise in that condition. The criteria were reviewed and approved by the clinical staff of service units C and D, which were the original pilot sites. The criteria were presented to the clinical staff of each of the other pilot sites before or during the study and there were no particular objections to the criteria established.

Within each tracer condition, indicators were selected to include criteria that were considered essential to good basic health care. Items that were controversial or would be applicable in only a small percentage of cases were not used in formulating the indicators. Also tasks which were felt to be

reliably documented (or at least should be reliably documented) were more often incorporated into the indicators. Items which might be performed regularly, but infrequently documented, such as elements of the history or physical exam or counseling tasks, were incorporated into indicators only when they were considered to be essential for basic health care. The indicators are shown in tables 3 to 13.

Data collection instruments were designed for extracting the data required to compute each indicator and were subsequently field-tested. These were described and illustrated previously [3].

Previous experience with the methodology has suggested that a number of individuals can perform well in data collection. In this pilot study data collectors included undergraduate students in health administration, a medical student, a physician, and a laboratory technician with an MPH degree. A study of reliability, using the physician as a standard, was done on a sample of the cases reviewed by each data collector. Agreement between the physician and the data collector equalled or exceeded 90% in each instance.

Patient cohorts were selected for audit for each tracer by sampling from the entire beneficiary population as nearly as possible. This was done in an attempt to remove bias toward patients who were more frequent utilizers of health care. This was more easily accomplished in the IHS and HMO's where the beneficiary populations were well defined. In the private practices patient cohorts were obtained from the medical records. Although this may contribute to a bias in favor of better care for the private practice, it would have been equally unfair to expect them to provide care to all people in their catchment area.

To examine the quality of prenatal care, a list was compiled of all women pregnant during the study year by examining birth certificates, the delivery room log, discharge diagnoses, operative reports, and lab requisitions for "prenatal lab work." From this list a sample was chosen using standard sampling techniques. Similar techniques were used to gather a sample of infants for examination of infant care, and of adults for audit of hypertension screening. Cohorts for urinary tract infection and anemia were selected from laboratory slips or the laboratory log as these tracers examined the continuity of care distal to the screening process. Any patient found on audit to have underlying renal disease or a non-nutritional cause of anemia were discarded from the sample. Patient cohorts for streptococcal pharyngitis were generated by randomly pulling medical records and searching for a visit involving a sore throat. Finally, the patient cohorts for lacerations were identified by review of the emergency room log.

Audit of the care for each patient involved examination of each health record extant for that patient. In many cases this required audit of a medical record at the hospital, one or more field clinic records, and public health nursing records, in order to extract a complete profile of care for each patient for that tracer condition.

RESULTS AND DISCUSSION:

Tables 3 through 13 present the results for each tracer condition. The data has been aggregated within tracer condition by indicator and is expressed as a weighted mean for IHS, rural private practice, and the HMO's. Since there was a substantial variance within pilot sites of the same type, the range is also shown.

At the outset it should be emphasized that the central purpose of this quality assessment methodology is not to generate statements of "good" or "bad" care. Rather it is designed to identify the relative weaknesses in the system of care that require attempts at improvement. Further, it should be emphasized that the results of this study should not be widely generalized to all health care settings of the Indian Health Service, rural private practice, or Health Maintenance Organizations. The non-random method of selecting pilot sites and the substantial variance between sites of the same practice configuration (e.g. IHS, rural private practice, HMO) precludes any conclusions that one practice configuration is superior to another. Finally, it should be pointed out that this study does not examine all aspects of quality of health care. Rather its focus is on effectiveness and continuity of health care, through examination of basic elements of the process of care and selected indicators of outcome. It does not examine issues such as accessibility and acceptability of care, the fine details of a complete diagnostic evaluation and treatment plan, nor does it examine the long term outcomes of care in terms of mortality, level of function, or patient satisfaction with eventual health status.

WELL PATIENT CARE:

Examination of the population-based indicator results for infant care (table 3) and prenatal care (table 6) reveal generally low rates for counseling and educational tasks received by the beneficiary populations. Of this group nutritional counseling for infants (table 3) and family planning counseling (table 6) appear to receive the most widespread application. From the data it appears that within the pilot sites of this study, the IHS and the HMO's

provide the most widespread application of counseling and health education tasks.

The health care tasks related to health status monitoring are also generally quite low. The growth, development, and diet monitoring rates for infants (table 3) indicate that these health services are being distributed to far less than 50% of the infants. However, the growth and diet monitoring rates from the provider perspective (table 5) are somewhat better. This data would suggest that the limiting factor for both health services is the patient's utilization of services. However, the provider-based rates also indicate that many opportunities to provide these services are being overlooked. A similar, although more dramatic, pattern is noted in the pregnancy monitoring rates (tables 6 and 8), where the population-based indicator (table 6) is relatively low compared to the excellent provider-based rates (table 8) for this indicator.

In this study, the data collection procedure was extremely lenient in interpreting the content of the record regarding educational, counseling, and monitoring tasks. For example, single statements such as "walking" or "rolling over" or "development WNL" were considered adequate for the "development monitoring rate" (table 6). Nonetheless, it could be argued effectively that the performance of educational, and counseling tasks is substantially better than the documentation of performance. While this may be very true, the importance of documentation of tasks critical to adequate care cannot be over-emphasized, particularly in a setting in which multiple providers participate in the care of patients. Without adequate documentation, the assessment of service needs for any given patient visit rests on the provider's assumption rather than knowledge of which tasks have been done and which are

due.

The immunization rates of tables 3 and 5 deserve comment. Of the total infant cohorts 69%, 58%, and 44% of infants had received 3 DPT and 2 OPV immunizations by age 13 months in the IHS, private practice, and HMO's, respectively. When measles and rubella were added to the criteria ("total immunization rate"), the results were somewhat lower. The "DPT immunization rate" from the provider perspective (table 5) suggests that substantial opportunities to provide immunization to infants who are due, are being missed. It should be noted that the audit period of this study preceded the current immunization recommendations of the Academy of Pediatrics that measles be deferred until 15 months of age.

Finally, it is important to note that the risk assessment rate for pregnancy (table 6) did not exceed 10% in any of the practice types, and reached a high of only 30% in one pilot site. This indicator was extremely lenient requiring only a single statement of risk or prognosis of pregnancy by the 20th gestational week. From the provider-based perspective (table 8) the results are similarly discouraging.

SCREENING:

Of the indicators relating to screening for infants (table 3) the "anemia screening rates" and "TB screening rates" appear to be substantially higher in the IHS and HMO's. However, the results for the "hip dysplasia screening rate" show no substantial difference among practice configurations. For the pregnancy induced hypertension screening rate (table 6) the IHS appears to achieve less coverage than either the HMO's or private practice. However, the provider performance is nearly the same and exceeds 90% in each practice type for this

health task (table 8), indicating that the low population-based rate is due to patient behavior rather than provider performance. It is of note that the recognition of abnormal blood pressures (greater than 90 mm Hg, diastolic) is substantially less in the IHS from both the population (table 6) and provider (table 8) perspectives.

Other indicators of screening for prenatal care, infant care, streptococcal pharyngitis and hypertension show similar patterns. The most consistent trend is observed in the provider-based indicators. Regardless of which practice configuration achieves the highest coverage rate, that indicator when viewed from the provider perspective generally reveals very similar patterns of provider performance. This would indicate that the major differences in systems performance for screening are issues of patient utilization and continuity of care rather than issues of provider performance.

DIAGNOSTIC EVALUATION:

The diagnostic evaluation was examined through indicators for prenatal care, lacerations, urinary tract infections, and iron-deficiency anemia. The criteria for the diagnostic evaluation indicators were purposefully simple and emphasized the most basic elements of a diagnostic work-up. More complex diagnostic tasks and those applicable to a smaller percentage of cases were not included for examination.

The prenatal work-up rate is substantially higher in the HMO's from both population (table 6) and provider (table 8) perspectives. This is a compound indicator calling for a serology for lues, cervical culture for GC, pap smear, and clinical pelvimetry by the 20th gestational week. The rates for IHS and private practice are low principally due to the infrequency with which cervical

cultures were obtained. The other indicators of diagnostic evaluation show no particular pattern.

TREATMENT PLANNING:

Indicators of treatment planning were included for lacerations, streptococcal pharyngitis, urinary tract infections, and iron-deficiency anemia. No consistent pattern of superior performance is noted among the practice configurations. For streptococcal pharyngitis (table 10) there were three indicators of treatment planning. The "treatment rate" examines the precent of patients with a positive strep culture who received any antibiotic within five days. The "treatment-of-choice rate", however, requires a specific dose of benzathine penicillin, or oral penicillin or erythromycin for 10 days. The "unsupported treatment rate" examined the percent of patients with pharyngitis who received an antibiotic without a previous or concurrent throat culture. It is interesting to note that private practices maintained a consistent pattern through the three treatment indicators and also had the highest screening yield of throat cultures at 39%.

FOLLOW-UP:

The follow-up functions were examined for postpartum care (table 6), lacerations, urinary tract infection, and iron-deficiency anemia. The striking pattern noted is that provider performance on the follow-up tasks is consistent across all practice types for each tracer, while over-all differences are generally due to system recognition or patient behavior. The indicators of postpartum care (table 6) underscore this point. The "postpartum contact rates" vary from 57% in the IHS to 85% in the private practices. The extent of application of follow-up among patients who delivered (postpartum follow-

up rate-2) varies from 26% in the IHS to 39% in the HMO's. However, the "postpartum follow-up rate-1" which measures follow-up task completion for patients who make postpartum visits was relatively constant across practice types.

CONTINUITY OF CARE:

The indicators for urinary tract infections (table 11), iron-deficiency anemia (table 12) and hypertension screening (table 13) were constructed to assess the continuity of health care. Each expresses the probability (based on empirical data) that patients successful in the preceeding element of care will pass successfully through the next process element. Likewise the transition rates through multiple successive elements of the process of care can be expressed as the product of the intervening rates. Perhaps the most publicized sequence of transition rates is the "½ x ½" series used to describe the care of hypertensive patients. According to a public health advertizing campaign, only one-half of the hypertensive patients have been diagnosed, and of these, only one-half are under treatment. The product of these (0.5 x 0.5 = 0.25) expresses the probability that a given hypertensive individual has been diagnosed and placed on medical management.

This analytic technique has been applied to the data for urinary tract infections and is shown in table 14. The "overall process success rate" is derived from the product of the successive indicators and is 11% for the IHS and HMO's and 10% for the private practices. The same approach can be used to examine selected sequences of care. For example, the probability that a screened positive individual will progress through the sequence as far as treatment is (0.88 x 0.89 x 0.50 x 0.95 = 0.37) for the IHS, (0.86 x 0.97 x 0.37 x 0.95 = 0.29) for the private practices, and (0.80 x 0.97 x 0.27 x 0.90

= 0.19) for the HMO's. Further the probability that a treated patient will progress successfully through the follow-up sequence is (0.68 x 0.59 x 0.72 = 0.29) for the IHS, (0.61 x 0.79 x 0.73 = 0.35) for rural private practice, and (0.77 x 0.92 x 0.80 = 0.57) for the HMO's.

Similarly the probability that the patient will make the required contact with the provider of health care can be estimated from the product of the "evaluation contact rate" and the "follow-up contact rate". This results in (0.88 x 0.68 = 0.60) for the IHS, (0.86 x 0.61 = 0.52) for the private practices, and (0.80 x 0.77 = 0.62) for the HMO's. The probability that the need for service on these visits will be recognized can be expressed as the product of the "abnormal screening recognition rate" and the "follow-up recognition rate". This results in (0.89 x 0.59 = 0.52) for the IHS, (0.97 x 0.79 = 0.77) for private practice, and (0.97 x 0.92 = 0.89) for the HMO's. Finally, the probability that all diagnostic and treatment tasks will be completed, given patient contact and recognition, can be estimated from the product of the "diagnostic evaluation rate", "treatment rate", and "follow-up rate". These estimates suggest probabilities of (0.50 x 0.95 x 0.72 = 0.34) for the IHS, (0.37 x 0.95 x 0.73 = 0.26) for the private practices, and (0.27 x 0.90 x 0.80 = 0.19) for the HMO's.

Similarly it is possible to estimate the impact of improving selected aspects of care by substituting in the cross product equation. For example, the benefit derived from increasing the recognition functions to an ideal level can be estimated by substituting 1.0 for the observed rates of recognition steps. Since an improvement of this magnitude may be somewhat unrealistic, an estimate can be made of the impact of increasing the recognition rates to a level midway between the observed and ideal rates. This can be done by

substituting

$$\text{Observed rate} + \frac{(1.0 - \text{observed rate})}{2}$$

for the "recognition" indicators.

As an example, table 14 compares the observed "overall process success rates" for urinary tract infections with those derived from estimates of improving selected functions to the 90% level. Improving patient contact rates does not result in a dramatic change, but would appear to result in relatively more improvement in the continuity of care for private practice. Similarly improving recognition rates to the 90% level would appear to most benefit care in the IHS. Improving the diagnostic, treatment, and follow-up tasks to the 90% level would result in substantial improvement in all three practice configuration, raising the "overall process success rate" to a high of 40% in the HMO's. It is instructive to note that of the latter only the diagnostic evaluation and follow-up rates were observed at levels less than 90%. The criteria for these indicators are basic and certainly do not involve sophisticated tasks or complex diagnostic logic.

This analytic approach to the continuity of care for iron-deficiency anemia yields similar trends. However, a slightly different pattern is observed in hypertension screening shown in table 15. In this case the "overall process success" (for screening) is 20%, 32%, and 30% for the IHS, private practice, and the HMO's, respectively. The greatest improvement in the continuity of care for the IHS and private practice derives from increasing the contact rates to 90%, and improving the screening rates have the least impact. On the other hand, the HMO's derive approximately the same improvement in the continuity of care from each projection.

HEALTH STATUS INDICATORS:

The health status indicators for infant care (table 4) and prenatal care (table 7) are not particularly enlightening due to the relatively low frequency of poor outcomes in these two well-patient groups. However, the "adequate growth rate" for infants (table 4) reflects expected results despite the previously noted low rates of nutritional counseling, growth monitoring, and diet monitoring. This raises the question of whether these processes of care have a substantial impact on outcome.

The "observed rate of anemia" for prenatal patients (table 7) was substantially lower in private practice than in the IHS or HMO's. The relatively high operative delivery rate in the HMO's is largely due to the 22% rate of operative deliveries in one site. The relatively low "repeat pregnancy rates" in the IHS may be related to the relatively high "family planning counseling" rate of table 6.

The "observed wound infection rate" for lacerations (table 9) is not instructive and the positive strep culture yield for streptococcal pharyngitis (table 10) has received previous comment.

Of those patients who had received treatment and a follow-up culture for urinary tract infections (table 11), a substantial number in each practice site had organisms in their urine at follow-up. This raises questions of the choice of antibiotic, duration of treatment, and patient compliance with the treatment plan. Similarly, of those patients who were treated for iron-deficiency anemia and followed-up with a repeat hematocrit and/or hemoglobin in the IHS, 45% still had abnormal values. In addition to the questions raised regarding UTI's, this result may indicate that a course of iron therapy is being utilized as a diagnostic procedure. It would have been

instructive to audit the subsequent care of those patients whose repeat blood counts were abnormal.

Finally, the screening yield for hypertension (table 13) measured the percent of patients screened who had one or more diastolic blood pressures above 90 mm Hg. No substantial differences between practice types are observed.

CONCLUSIONS:

Comparison of the systems performance for the tracers of this study have several important implications. There appears to be no substantial and consistent difference in the performance of the providers of care. Most of the differences observed are attributable to patient contact with the system of care or system recognition of the need for service. However, the provider indicators, however consistent, do not reveal a particularly high level of performance considering that the criteria for diagnostic, treatment, and follow-up indicators emphasized only the most basic elements of care. It would therefore appear that overall systems performance could be substantially improved if providers in all practice types capitalized on existing patient visit patterns to perform needed health tasks.

The results of this study do not suggest that one practice configuration is superior to another. Among the specific pilot sites of this study, however, it appears that the IHS provided more widespread application of counseling and educational tasks, and selected screening tasks. The patient contacts with the system were relatively high although the recognition of need for service was relatively low. Both may be due in part to the multi-disciplinary health care team and extensive field health program of the IHS. This would

tend to increase the probability of patient contact but also would tend to increase the difficulty in communication among all members of the health care team.

Conversely the recognition of the need for service appears to be higher in the private practices and HMO's. The overall tendency for private practice to excell in recognition may be due in part to the less complex system of private practice and the tendency for a patient to consistently be seen by the same provider of services. It would also appear that the follow-up functions are generally more completely achieved in private practice and the HMO's, with rates of patient contact for follow-up being somewhat higher in the private practices. The only consistent difference between HMO's and private practice observed in the pilot sites of this study would suggest that the HMO's achieve a somewhat higher application of counseling, education, and health surveillance tasks among their beneficiary populations.

The study suggests four major methodological areas that should be of concern in future application of quality assessment techniques to ambulatory care. First, examination of provider performance alone does not necessarily reflect the adequacy of care received by the patient population. In this study, population-based and provider-based indicators were employed to examine the effectiveness of care provided and the effectiveness of care received.

Second, the study specifically designed indicators to examine the continuity of care. These results suggested significant impediments to the continuity of health care that emphasized the adequacy of the diagnostic and therapeutic process alone. This study would suggest that improving the adequacy of only the diagnostic and treatment aspects of care to an ideal level would not result in continuous care for the majority of patients.

The study suggests three major methodological areas that should be of concern in future application of quality assessment techniques to ambulatory care. First, examination of provider performance alone does not necessarily reflect the adequacy of care received by the patient population. In this study, population-based and provider-based indicators were employed to examine the effectiveness of care provided and the effectiveness of care received.

Second, the study specifically designed indicators to examine the continuity of care. These results suggested significant impediments to the continuity of health care that would not have emerged from a study that emphasized the adequacy of the diagnostic and therapeutic process alone. This study would suggest that improving the adequacy of the diagnostic and treatment aspects of care to an ideal level would not result in continuous care for the majority of patients.

Third, examination of health status indicators do not add significantly to the information derived from this methodology. However, important outcome measures may be to assessing the quality of health care, additional developmental work is needed to clarify a concept of health outcome and apply it to quality assessment techniques for ambulatory care.

Finally, this study methodology is based on the tracer approach to assessing health care. As such it makes two assumptions which have never been adequately tested. First, it assumes that the information derived from examination of a "tracer" disease is similar to that which would have been obtained from examination of other "similar" conditions. More importantly, the implicit assumption within a tracer approach is that adoptive processes directed at improving identified deficiencies in health care for a tracer, will result also in improvements in other "similar" conditions. The latter assumption is

particularly tenuous as attention directed toward a tracer condition may, in reality, detract from the care provided for other similar conditions. Several studies are currently underway at the Office of Research and Development, IHS to test there assumptions, but until objective evidence is available, such assumptions must be viewed as tentative.

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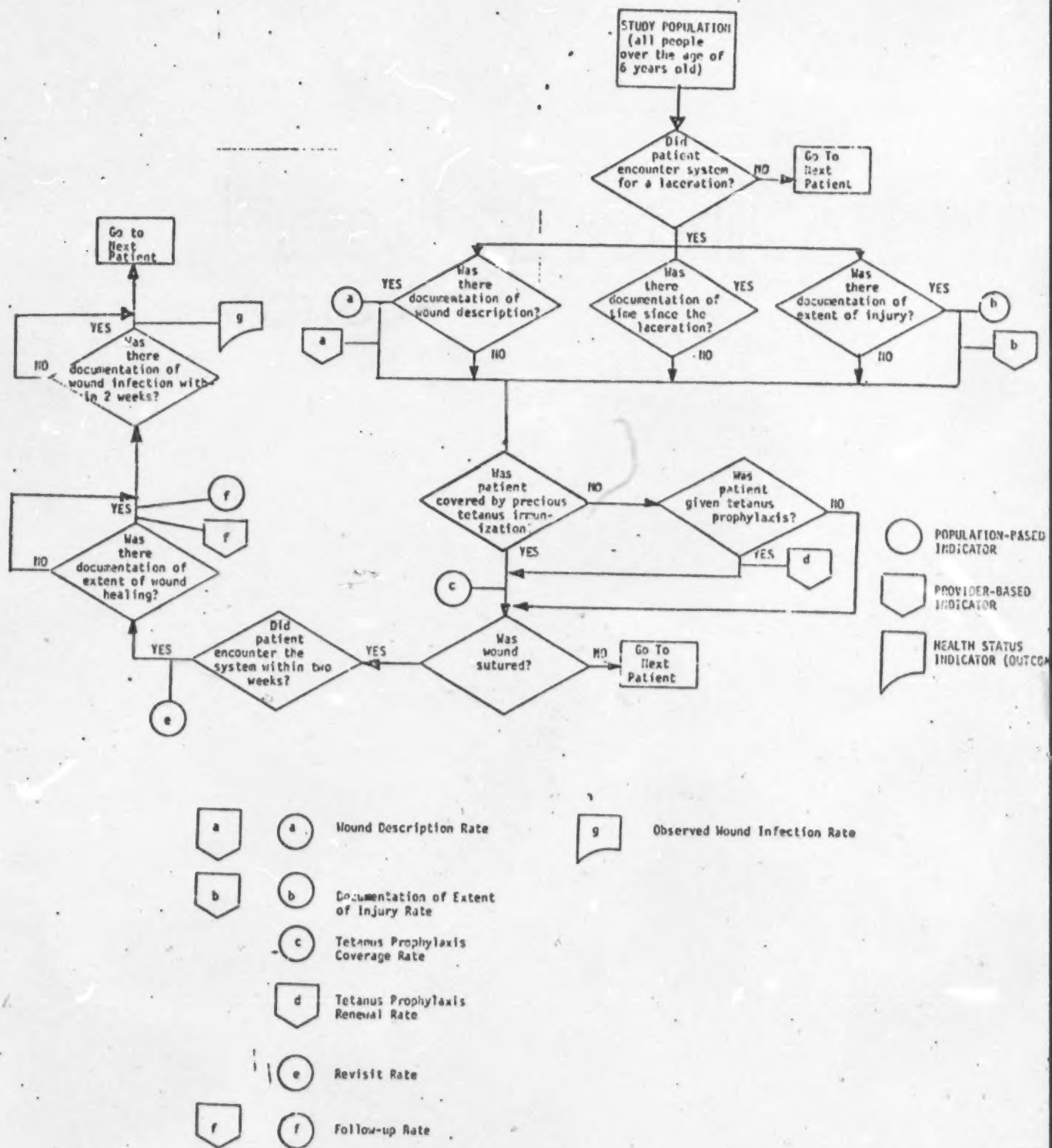
STUDY POPULATION (all people over the age of 6 years old)
Did patient encounter system for a laceration?
NO
Go To Next Patient
YES
Was there documentation of wound description?
Was there documentation of time since the laceration?
Was there documentation of extent of injury?
Was patient covered by precious tetanus immunization?
Was patient given tetanus prophylaxis?
Was wound sutured?
Go To Next Patient
Did patient encounter the system within two weeks?
Was there documentation of extent of wound healing?
Was there documentation of wound infection within 2 weeks?
Go to Next Patient
POPULATION-BASED INDICATOR
PROVIDER-BASED INDICATOR
HEALTH STATUS INDICATOR (OUTCO
a Wound Description Rate
b Documentation of Extent of Injury Rate
c Tetanus Prophylaxis Coverage Rate
d Tetanus Prophylaxis Renewal Rate
e Revisit Rate
f Follow-up Rate
g Observed Wound Infection Rate

FIGURE 1: Process Map For Laurations, Showing The Points In The Process Of Care From Which Indicator Data Is Extracted.

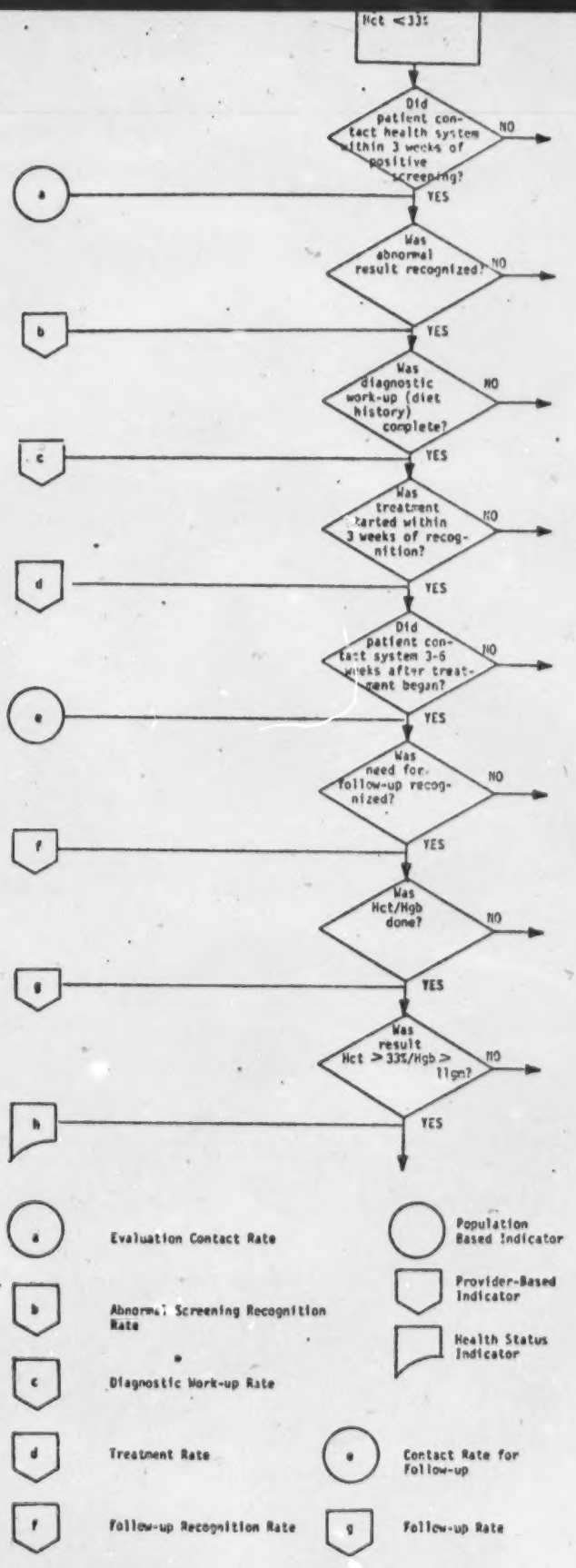

FIGURE 2: Process Map For Iron-Deficiency Anemia. Indicators Placed Sequentially Along The Process Can Express "Continuity" As A Series Of Conditional Probabilities based On Empirical Data. In This Way, The Relative Impediments to Continuity Can Be Pinpointed.

TRACER CONDITION	ASSESSMENT PERSPECTIVE		CLINICAL FUNCTIONS OF HEALTH CARE					
	Population-Based Indicators	Provider-Based Indicators	Prevention	Well-Patient Surveillance	Screening	Diagnostic Evaluation	Treatment	Follow-up
PRENATAL CARE	X	X	X	X	X			
INFANT CARE	X	X	X	X	X			
STREPTOCOCCAL	X				X	X	X	
LACERATIONS OF SCALP AND EXTREMITIES	X					X	X	X
HYPERTENSION	X	X			X	X		
URINARY TRACT INFECTION	X	X				X	X	X
IRON-DEFICIENCY ANEMIA	X	X			X	X	X	X

TABLE 1: Tracer Conditions Used In Pilot Study In Relation To The Assessment Perspective And The Clinical Functions of Health Care.

Pilot Site	Approximate Population Of Catchment Area	Approximate Size Of Catchment Area	Fixed Facilities	No. Of MD's	Physician Extenders	No. Of Public Health Nurses	No. Of Community Health Workers
IHS "A"	900	111 sq.mi.	1 clinic	1	1	1	4
IHS "B"	6,155	2,854 sq. mi.	. 50 bed hospital & OPD . 1 Field Clinic	5	3	5	10
IHS "C"	14,480	92,000 sq.mi.	170 bed medical center and multi-disaplinary OPD 2 Field Clinics	40	1	5	35
IHS "D"	3,800	38,000 sq.mi.	29 bed hospital & OPD	2	0	3	30
IHS "E"	4,926	6,375 sq.mi.	41 bed hospital & OPD	5	1	1	25
IHS "F"	4,554	5,200 sq.mi.	. 39 bed hospital & OPD . 1 Field Clinic	4	2	2	16
Private Practice "A"	20,000	1,600 sq.mi.	. 1 medical office . Attending at 30 bed hospital	3	1	0	0
Private Practice "B"	5,000	1,800 sq.mi.	. 1 medical office . Attending at 30 bed hospital	2	0	0	0
Private Practice "C"	15,000	5,000 sq.mi.	. 1 medical office . Attending at 30 bed hospital	5	0	0	0
IHO "A"	22,600	2,700 sq.mi.	. 2 medical offices . Attending at 250 bed & 300 bed hospital	20	5	0	0
IHO "B"	11,000	1,500 sq.mi.	1 medical office Attending at 2, 300 bed hospitals	16	2	0	0

TABLE 2: Comparison Of Pilot Sites By Major Characteristics

INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGREGRATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS		
		MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)
Initial Feeding Instruction Rate	Percent of infant's mothers who received diet or feeding instructions documented prior to discharge after delivery.	51%	274	13-90	—		—	—		—
Initial Infant Care Counseling Rate	Percent of infant's mothers who had documentation of counseling on general topics of infant care prior to discharge after delivery.	48%	274	10-70	—		—	—		—
Infant Care Counseling Rate	Percent of infant's mothers who had documentation of infant care counseling at least once in the first 6 months and at least once in the second 7 months of life.	32%	274	0-78	5%	127	0-15	37%	54	0-41
Growth Monitoring Rate	Percent of infants who had weight and length recorded at least 3 times in the first 6 and at least 2 times in the second 7 months of life.	26%	277	3-42	1%	127	0-2	33%	54	0-37
Development Monitoring Rate	Percent of infants who had documentation of developmental milestones at least 4 times in the first 6 months and at least 3 times in the second 7 months of life.	8%	277	0-40	1%	127	0-2	4%	54	2-20
Diet Monitoring Rate	Percent of infants who had documentation of dietary intake at least 4 times in the first 6 months and at least 3 times in the second 7 months of life.	7%	277	0-22	2%	127	0-5	7%	54	6-20
Anemia Screening Rate	Percent of infants who had a hemoglobin or hematocrit recorded between age 6-13 months.	43%	277	7-72	11%	127	5-18	35%	54	35-40
Td Screening Rate	Percent of infants who had a PPD or Tine test recorded between ages 6-13 months.	51%	277	23-83	12%	127	6-22	50%	54	40-51
Hip Dysplasia Screening Rate	Percent of infants who had documentation of a hip exam in the first 6 months of life.	49%	277	0-90	38%	127	2-78	33%	54	20-35
DPT-OPV Immunization Rate	Percent of infants who received 3 DPT and 2 OPV immunizations by age 13 months.	69%	277	53-90	58%	127	42-69	44%	54	41-80
Total Immunization Rate	Percent of infants who received 3 DPT, 2OPV, a measles, and rubella immunization by age 13 months.	40%	277	16-52	14%	127	12-17	33%	54	20-35
Nutrition Counseling Rate	Percent of infants who received nutrition counseling 3 times in the first 13 months of life.	41%	278	0-68	3%	127	0-10	52%	54	49-80

TABLE 3 : System Performance For Infant Care
(Population-based process indicators)

INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGREGRATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS		
		MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)
Adequate Growth Rate	Percent of infants who were between the 10th and 90th percentiles for height and weight at approximately one year of age.	74%	179	69-85	76%	98	71-79	81%	16	77-100
Birth Depression Rate	Percent of infants who had an Apgar of 6 or less at one minute or less than 8 at five minutes.	3%	277	0-6	5%	121	0-7	4%	22	0-5

TABLE 4 : Infant Care Outcomes
(Health Status Indicators)

INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGREGRATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS		
		MEAN % weighted	No. visits	RANGE (in %)	MEAN % weighted	No. visits	RANGE (in %)	MEAN % weighted	No. visits	RANGE (in %)
Growth Monitoring Rate	Percent of infant visits resulted in recording of length and weight during the first 13 months of life.	47%	1963	34-67	32%	925	21-45	56%	436	34-59
DPT Immunization Rate	Percent of infant visits made when due for a DPT immunization, resulted in the immunization being given.	55%	1194	38-96	46%	462	10-79	58%	233	57-68
Diet History Rate	Percent of infant visits during the first 13 months of life, which resulted in any statement of recent dietary intake.	38%	1963	12-69	21%	925	4-41	55%	436	40-57

TABLE 5 : Provider Performance
For Infant Care (provider-based
process indicators)

INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGREGATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS		
		MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)
Prenatal Entry Rate	Percent of pregnant women who encountered the health care system by the 20th week of gestation.	64%	300	40-88	73%	134	70-76	97%	69	94-98
Prenatal Work-Up Rate	Percent of pregnant women who had documentation of VDRL, cervical culture, pap smear, and clinical pelvietry by the 20th week of gestation.	20%	300	0-36	1%	134	0-2	62%	69	62-63
Risk Assessment Rate	Percent of pregnant women who had a statement of risk or prognosis of pregnancy by the 20th week of gestation.	9%	300	0-30	9%	134	2-16	10%	69	7-12
Desire For Pregnancy Documentation Rate	Percent of pregnant women who had documentation of whether pregnancy was wanted, unwanted, or undecided by the 13th week of gestation.	16%	300	0-40	9%	134	0-16	26%	69	11-36
Unwanted Pregnancy TAB Rate	Percent of women with documentation of unwanted pregnancy the the 13th week who received a TAB.	81%	16	81*	100%	4	100*	100%	7	100*
Family Planning Counseling Rate	Percent of pregnant women who had documentation of family planning counseling during the pregnancy prior to delivery.	53%	284	10-84	12%	129	0-31	2%	58	0-3
TAB Family Planning Rate	Percent of women with TAB who began family planning within 8 weeks after the TAB.	100%	16	100*	75%	4	75*	100%	7	100*
Postpartum Family Planning Rate	Percent of women who began family planning or for whom their intention not to begin family planning was documented within 8 weeks of delivery.	61%	284	24-76	56%	134	32-80	58%	48	26-100
Nutritional Counseling Rate	Percent of pregnant women who received nutritional counseling by the 20th week of gestation.	15%	284	0-50	2%	134	0-6	5%	57	0-10

TABLE 6: System Performance For Prenatal Care (population-based process indicators)

* Sample available from only one site

INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGREGATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS		
		MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No pts	RANGE (in %)	MEAN % weighted	No pts.	RANGE (in %)
PIH Screening Rate	Percent of pregnant women who had their blood pressure recorded at least 3 times in the second and 5 times in the third trimester.	25%	284	3-42	64%	117	10-88	51%	57	30-70
Abnormal Blood Pressure Recognition Rate	Percent of patients with a diastolic BP>90, who had a diagnosis or narrative documenting recognition of the abnormal result.	36%	36	0-100	81%	16	60-100	83%	6	83*
Anemia Screening Rate	Percent of pregnant women who had a hemoglobin or hematocrit recorded in the first 20 weeks of gestation.	53%	284	4-81	76%	134	61-91	63%	57	33-96
Pregnancy Monitoring Rate	Percent of pregnant women who had the fundal height recorded at least 3 times in the second and 5 times in the third trimester, and had the fetal heart rate recorded at least once in the second and 5 times in the third trimester.	16%	284	0-44	51%	123	10-76	39%	57	18-57
Postpartum Contact Rate	Percent of delivered patient who made a visit within 8 weeks after delivery.	57%	284	34-75	85%	134	68-98	62%	69	60-64
Postpartum Follow-Up Rate -1	Percent of delivered patients making a post-partum visit with any statement regarding exam of uterus, BP, and weight.	46%	161	24-54	46%	114	0-88	51%	43	48-56
Postpartum Follow-Up Rate -2	Percent of delivered patients with any statement documenting examination of the uterus, BP, and weight by 8 weeks after delivery.	26%	284	13-39	32%	69	31-33	39%	134	0-86

TABLE 6 : Continued

* Sample available from only one site

INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGREGRATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS		
		MEAN % weighted	No. pts	RANGE (in %)	MEAN % weighted	No pts	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)
NORMAL BIRTH WEIGHT RATE	Percent of pregnancies resulting in a birth weight between 5 lbs. 8 oz. and 9 lbs.	86%	281	62-96	77%	94	62-100	93%	41	88-96
ACCEPTABLE ONE MINUTE APGAR RATE	Percent of pregnancies resulting in an infant with a one minute Apgar of 7 or greater.	90%	276	69-96	90%	52	83-100	93%	43	90-95
OBSERVED PIH RATE	Percent of pregnancies with documentation of PIH or documentation of a diastolic BP 90 mm Hg.	13%	284	0-26	12%	134	7-16	10%	57	0-20
OBSERVED GESTATIONAL DIABETES RATE	Percent of pregnancies with documentation of gestational diabetes.	6%	225	0-12	—			—		
OBSERVED ANEMIA RATE	Percent of pregnancies screened for anemia with documentation of a HCT < 37% or a Hgb < 12.	29%	246	15-71	9%	134	2-24	38%	52	23-54
OPERATIVE DELIVERY RATE	Percent of pregnancies resulting in delivery by C-section.	2%	204	0-6	4%	134	0-14	12%	50	4-22
REPEAT PREGNANCY RATE	Percent of women who become pregnant again within 12 months of previous delivery.	15%	192	7-28	26%	106	11-40	18%	43	13-24

TABLE 7 : Prenatal Care Outcomes
(Health Status Indicators)

INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGREGRATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS		
		MEAN % weighted	No. visits	RANGE (in %)	MEAN % weighted	No. visits	RANGE (in %)	MEAN % weighted	No. visits	RANGE (in %)
Prenatal Work-up Rate	Percent of first prenatal visits which resulted in a VDRL, cervical culture, pap smear, and clinical pelvimetry within 2 weeks of the first visit.	34%	298	12-62	1%	134	0-4	70%	69	63-74
Risk Assessment Rate	Percent of first prenatal visits which resulted in a statement of risk or prognosis of pregnancy within 2 weeks of the first visit.	9%	298	0-28	10%	134	6-16	10%	69	7-12
Prenatal work-up Rate (by 20th week)	Percent of first prenatal visits occurring prior to the 20th week, which resulted in a documentation of a VDRL, cervical culture, pap smear, and clinical pelvimetry by the 20th week.	30%	193	0-58	13%	98	10-17	73%	66	68-76
Risk Assessment Rate (by 20th week)	Percent of first prenatal visits occurring prior to the 20th week, which resulted in a statement of risk or prognosis of pregnancy prior to the 20th week.	10%	193	0-34	12%	98	3-23	11%	66	8-12
Desire for Pregnancy Documentation Rate	Percent of first prenatal visits which resulted in a statement of whether the pregnancy was wanted, unwanted, or undecided.	17%	298	0-33	9%	134	0-16	26%	69	11-36
Unwanted Pregnancy Counseling Rate	Percent of prenatal visits for women with unwanted or undecided about pregnancy within two weeks of documentation, resulted in counseling regarding desire for pregnancy.	95%	19	50-100	100%	7	100-100	86%	7	85-86
Anemia Screening Rate	Percent of first prenatal visits which resulted in documentation of a hematocrit or hemoglobin within two weeks of first visit.	85%	298	67-98	85%	134	61-100	87%	69	81-96
Pregnancy Monitoring Rate	Percent of prenatal visits made after first visit which resulted in documentation of the fundal height.	79%	1753	54-85	92%	1234	83-99	82%	517	81-82
Pill Screening Rate	Percent of prenatal visits made in the second and third trimester which resulted in documentation of the diastolic blood pressure.	94%	1739	91-98	94%	1179	72-100	93%	500	87-98
Abnormal Blood Pressure Recognition Rate	Percent of prenatal visits with a recorded diastolic blood pressure greater than 90 mm Hg., resulted in a diagnosis or narrative indication recognition of the abnormal result.	36%	55	0-100	85%	34	60-92	100%	4	100*

TABLE 8: Provider Performance For Pronatal Care
(Provider-based process indicators)

* Sample available from only one site

INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGREGRATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS		
		MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)
Wound Description Rate	Percent of scalp or extremity lacerations for which the following were documented: 1. Time since the laceration. 2. Cause of the laceration. 3. Description of laceration.	36%	394	23-54	40%	109	0-56	32%	38	31-33
Documentation Of Extent Of Injury Rate	Percent of scalp or extremity lacerations with documentation of assessment of bone, nerve, and/or vascular involvement.	27%	394	16-39	35%	109	21-53	29%	38	26-67
Tetanus Prophylaxis Coverage Rate	Percent of scalp or extremity lacerations which had documentation of current tetanus coverage, or were provided additional coverage.	62%	394	31-90	43%	109	33-100	82%	38	67-83
Revisit Rate	Percent of patients who had laceration sutured who had an encounter with any provider for any reason within 5 to 15 days after laceration was sutured.	64%	223	41-87	71%	85	50-83	94%	31	93-100
Follow-up Rate	Percent of patients with sutured laceration for whom some statement of wound healing was made within 5 to 15 days of initial encounter for the laceration.	56%	223	26-86	66%	85	50-77	84%	31	82-100
Observed Wound Infection Rate	Percent of scalp or extremity lacerations with documentation of a wound infection. (2 wks.)	6%	394	5-12	4%	109	0-4	10%	38	0-11

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TABLE 9 : System Performance For Lacerations (population-based process indicators)

INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGRECRATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS		
		MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)
Selective Screening Rate	Percent of patient-episodes of pharyngitis who received a throat culture within two days of the initial visit.	69%	534	57-85	58%	159	41-69	71%	99	67-76
Treatment Rate	Percent of patients with a positive strep culture who received an antibiotic within five days of the culture date.	90%	112	75-100	97%	30	86-100	76%	29	65-92
Treatment-Of-Choice Rate	Percent of patients with a positive strep culture who received either 1.2 mu LA bicillin (600,000 units for children less than 60 lbs. or 9 years of age), oral penicillin for 10 days, or erythromycin for 10 days within 5 days of the culture date.	79%	112	53-100	83%	30	57-100	72%	29	65-83
Unsupported Treatment Rate	Percent of patients with an episode of pharyngitis who received an antibiotic without receiving a throat culture.	22%	534	4-37	16%	159	12-20	14%	99	8-20
Positive Strep Culture Rate	Percent of pharyngitis episodes cultured which resulted in a positive culture for strep.	29%	372	5-36	39%	101	29-48	13%	71	5-21

TABLE 10 : System Performance For Streptococcal Disease (population - based process indicators)

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INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGREGRATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS			
		MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)	
Evaluation Contact Rate	Percent of patients with a positive urine culture (>100,000 organisms) who made contact with the health care system within 2 weeks of positive culture.	88%	249	72-98	86%	116	83-90	80%	96	78-83	
Abnormal Screening Recognition Rate	Percent of patients making contact within 2 weeks, who had any statement or action indicating that positive culture was recognized.	89%	233	69-100	97%	100	95-98	97%	77	95-100	
Diagnostic Evaluation Rate	Percent of patients with recognition of positive culture, who had documentation of the history, description of symptoms, temperature, and palpation of the abdomen.	50%	208	44-67	37%	97	21-55	27%	75	25-28	
Treatment Rate	Percent of patients with recognition of positive culture, who were placed on an appropriate antibiotic therapy within 2 weeks of positive culture.	95%	208	91-100	95%	97	93-100	90%	71	90-91	
Follow-Up Contact Rate	Percent of patients treated who made contact with the health care system within 1-4 weeks after the treatment started.	68%	198	57-79	61%	93	44-82	77%	65	71-83	
Follow-Up Recognition Rate	Percent of patients making contact for whom there was any statement of action indicating recognition of the need for follow-up.	59%	135	32-89	79%	57	66-89	92%	50	92-93	
Follow-Up Rate	Percent of patients with recognition of the need for follow-up who received a urine culture within 1-4 weeks after treatment started.	72%	80	18-96	73%	45	50-92	80%	46	74-87	
Negative Reculture Rate	Percent of patients treated and followed-up who had a repeat urine culture resulting in < 100,000 organisms.	67%	58	0-88	58%	43	46-68	62%	37	59-65	

TABLE 11 : Continuity Of Care
For Urinary Tract Infections

INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGREGRATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS		
		MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)
Contact For Screening Rate	Percent of infants and prenatal patients who made contact with the health care system when they required screening for anemia. (Percent of infants contacting the system between age 6-13 months. Percent of prenatal patients contacting the system by 20th week of gestation).	82%	571	70-94	86%	241	84-88	95%	123	94-96
Screening Rate	Percent of infants and prenatals making contact for screening, who had a hematocrit and/or hemoglobin.	63%	466	31-77	49%	225	41-53	63%	117	53-93
Evaluation Contact Rate	Percent of patients screened positive for anemia (HCT < 33 and/or Hbg < 11) who made contact with the system within 3 weeks after positive screening.	87%	226	56-100	90%	40	79-100	59%	104	58-59
Abnormal Screening Recognition Rate	Percent of patients making contact for whom there is any statement or action indicating recognition of the abnormal result.	69%	197	56-100	69%	36	45-93	72%	61	72-72
Diagnostic Work-Up Rate	Percent of patients with recognition of abnormal result, for whom any statement of dietary intake was made.	49%	178	18-80	44%	25	14-69	36%	44	22-52
Treatment Rate	Percent of patients with recognition of abnormal result, who were started on iron therapy. (1 wk)	82%	136	55-100	96%	25	80-100	57%	44	57-58
Contact Rate For Follow-Up	Percent of patients who made contact with the health care system within 3-6 weeks after iron therapy was instituted.	51%	112	33-73	87%	24	75-92	40%	25	31-50
Follow-Up Recognition Rate	Percent of patients contacting the system 3-5 weeks after therapy started, for whom there was any statement or action indicating the need for follow-up.	65%	57	20-91	80%	22	50-100	40%	10	25-50
Follow-Up Rate	Percent of patients with recognition of the need for follow-up who received a hemoglobin and/or hematocrit within 3-6 weeks after institution of iron therapy.	81%	37	50-100	90%	21	83-100	75%	4	67-100
Screening Yield	Percent of infants and prenatal patients screened for anemia who had a Hgb < 11 and/or Hct < 33.	24%	337	9.6-43	8.5	238	2-11	4.3%	119	2-9
Resolution Of Anemia Documentation Rate	Percent of patients with a repeat Hct and/or Hgb 3-6 weeks after therapy started, which resulted in a Hct ≥ 33 and/or Hgb ≥ 11.	55%	29	0-100	93%	15	50-100	67%	3	0-100

TABLE 12: Continuity Of Care For Iron-Deficiency Anemia

INDICATOR	DESCRIPTION	AGGREGATE DATA 6 SERVICE UNITS INDIAN HEALTH SERVICE			AGGREGATE DATA 3 RURAL PRIVATE PRACTICES			AGGREGRATE DATA 2 METROPOLITAN HEALTH MAINTENANCE ORGANIZATIONS			
		MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)	MEAN % weighted	No. pts.	RANGE (in %)	
Screening Contact Rate	Percent of population who made contact with the health care system at least once within the three year time frame (1/1/74-1/1/77).	78%	503	60-96	93%	329	90-95	93%	125	88-100	
Screening Rate	Percent of patients making contact who had their blood pressure recorded at least once (in the absence of trauma, pregnancy, intoxication, or under the influence of medication known to elevate blood pressure).	79%	394	66-100	83%	307	73-93	94%	116	91-98	
Abnormal Screening Recognition Rate	Percent of patients with a positive BP screen (diastolic BP > 90) for whom there was any statement or action indicating recognition of the abnormal result on that visit.	60%	67	20-80	68%	65	51-89	69%	26	69-70	
Abnormal Screening Contact Rate	Percent of patients with abnormal screening BP who made contact with the system within 6 weeks of the abnormal BP.	63%	51	33-100	63%	63	55-75	72%	18	58-82	
Rescreening Rate	Percent of patients making contact who had a blood pressure recorded within 6 weeks of the original abnormal result.	84%	32	50-100	98%	40	94-100	69%	13	67-75	
Screening Yield	Percent of patients screened during the time frame, who had one or more diastolic blood pressure readings above 90mm Hg.	22%	309	19-25	28%	254	21-33	24%	109	20-27	

TABLE 13 : Continuity of Care
For Hypertension Screening

TABLE 14: Urinary Tract Infections - Projecting overall process Success through improvements in selected clinical events.

	OBSERVED RATES			IF CONTACT RATES WERE IMPROVED TO .90			IF RECOGNITION RATES WERE IMPROVED TO .90			IF ACTION TASK RATES WERE IMPROVED TO .90		
	IHS	PP	HMO	IHS	PP	HMO	IHS	PP	HMO	IHS	PP	HMO
Evaluation Contact Rate	.88	.86	.80	.90	.90	.90	.88	.86	.80	.88	.86	.80
Abnormal Screening Recognition Rate	.89	.97	.97	.89	.97	.97	.90	.97	.97	.89	.97	.97
Diagnostic Evaluation Rate	.50	.37	.27	.50	.37	.27	.50	.37	.27	.90	.90	.90
Treatment Rate	.95	.95	.90	.95	.95	.90	.95	.95	.90	.95	.95	.90
Follow-up Contact Rate	.68	.61	.77	.90	.90	.90	.68	.61	.77	.68	.61	.77
Follow-up Recognition Rate	.59	.79	.92	.59	.79	.92	.90	.90	.92	.59	.79	.92
Follow-up Rate	.72	.73	.80	.72	.73	.80	.72	.73	.80	.90	.90	.90
Overall Process Success	.11	.10	.11	.14	.16	.14	.17	.12	.11	.24	.31	.40

	OBSERVED RATES			IF CONTACT RATES IMPROVED TO .90			IF RECOGNITION RATES IMPROVED TO .90			IF ACTION TASK RATES IMPROVED TO .90		
	IHS	PP	HMO	IHS	PP	HMO	IHS	PP	HMO	IHS	PP	HMO
Screening Contact Rate	.78	.93	.93	.90	.93	.93	.78	.93	.93	.78	.93	.93
Screening Rate	.79	.83	.94	.79	.83	.94	.79	.83	.94	.90	.90	.94
Abnormal Screening Recognition	.60	.68	.69	.60	.68	.69	.90	.90	.90	.60	.68	.69
Abnormal Screening Contact Rate	.63	.63	.72	.90	.90	.90	.63	.63	.72	.63	.63	.72
Rescreening Rate	.84	.98	.69	.84	.98	.69	.84	.98	.69	.90	.98	.90
Overall Process Success	.20	.32	.30	.32	.46	.38	.29	.43	.39	.24	.35	.39

TABLE 15: Hypertension - Projecting Overall Process Success Through Improvements in Selective Clinical Events.